Chapter 8

Wastewater Services Policies

The RWSP wastewater services policies are intended to guide King County in providing wastewater services to its customers and in operating and maintaining its system. The policies define the county's wastewater service area and provide direction on fulfilling contractual commitments. The policies also discuss measures to take to prevent sanitary sewer overflows and provide direction for actions to take in the event of an overflow.

The wastewater services policies recognize the region's investment in the regional wastewater system and the importance of ongoing maintenance and repair to protect this investment. To that end, the policies direct the county to establish and implement an asset management program to ensure continued reliability of the system's infrastructure. The policies also encourage county funding for research and development relating to water quality and technologies for the wastewater system. In addition, the policies recognize that the tribes have been providing important leadership and guidance in water quality stewardship and direct the county to continue its coordination with the tribes in efforts to protect water quality.

This chapter provides an overview on implementation of the RWSP wastewater services policies from 2004 through 2006. The chapter concludes with summary information on amendments to the RWSP wastewater services planning policies adopted by the King County Council in 2004–2006.

The complete text of all the wastewater services policies, including information on policy amendments and a summary of how each policy was implemented in 2004–2006, is provided in Appendix G.

8.1 Implementation of Wastewater Services Policies from 2004 through 2006

8.1.1 King County's Wastewater Service Area

In accordance with RWSP wastewater service policy (WWSP)-4, the perimeter of King County's wastewater service area is defined by the service areas of the component agencies in King, Pierce, and Snohomish counties that send their wastewater to the county's regional system for treatment and disposal (see Figure 8-1).

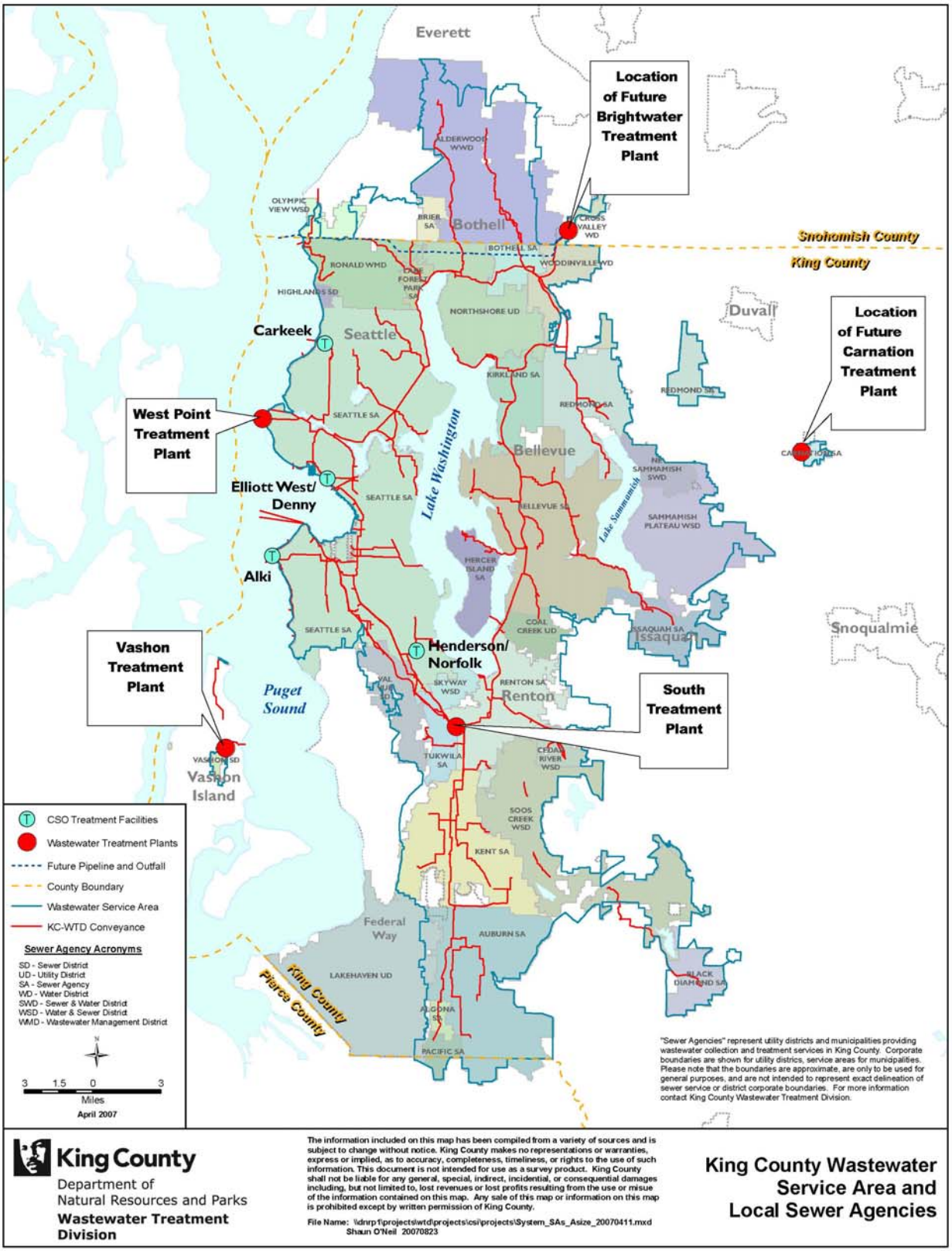

Figure 8-1. King County Wastewater Service Area and Local Sewer Agencies

The county's wastewater service area meets the requirements of the Washington State Growth Management Act (Chapter 36.70A RCW) and the King County Comprehensive Plan regarding the location and provision of sewer services.

8.1.2 Fulfilling Contractual Commitments

RWSP Wastewater Services Planning Policy (WWSP)-1 calls for the county to provide wastewater services to fulfill contractual commitments in a manner that promotes environmental stewardship, recognizes the value of wastewater in the regional water resource system, and reflects a wise use of public funds. Pursuant to long-term agreements and in accordance with Chapter 35.58 RCW, King County's Wastewater Treatment Division (WTD) provides wastewater treatment and disposal service to 17 cities, 16 sewer districts, and 1 Indian tribe.

Environmental stewardship is an important component of the county's wastewater treatment service. WTD's mission is to protect public health and enhance the environment by treating and reclaiming water, recycling solids, and generating energy. The county's treatment plants and associated facilities continue to meet or exceed the terms and conditions of their National Pollutant Disposal Elimination System (NPDES) permits.[1] WTD's vision of creating resources from wastewater is carried out in recognition of the overall value of wastewater.

King County provides high quality wastewater treatment in as cost-effective manner as possible. WTD routinely evaluates projects during the planning process and design phases to identify potential cost-savings. The division is also developing a formal and detailed asset management plan to optimize the useful life of the county's regional wastewater facilities; the efforts under way are described later on in this chapter. WTD's Productivity Initiative Pilot Program was developed to identify and implement ways to increase efficiency.[2] Through 2006, this pilot program has resulted in a $42.8 million savings to ratepayers.

8.1.3 Protecting Public Health and the Region's Investment in the Wastewater System

The wastewater services policies call for the county to construct, operate, and maintain its regional wastewater system to prevent sewage overflows, protect public health and the environment, comply with regulations, and improve services in a fiscally responsible manner. To meet these goals, the policies also provide direction on establishing and implementing an asset management program and on actions for the county to carry out in the event of sewage overflows.

[1] NPDES permits are issued by the Washington State Department of Ecology and set limits on the quality and quantity of effluent (treated wastewater) discharged from point sources such as treatment plants, CSOs, and industrial facilities.

[2] The Productivity Initiative Pilot Program is a ten-year incentive program that applies certain private-sector business practices to cut operating costs, increase productivity and continue a high level of service and environmental protection for WTD's customers. Chapter 13 provides more information on this program.

Chapter 9 (Water Quality Protection Policies) provides information related to sanitary sewer overflow prevention and containment, permit compliance, and source control programs designed to protect the public health and the environment. This section focuses on activities related to the planning and design of wastewater facilities, establishment and implementation of the asset management program in 2004–2006, and the county's emergency response procedures in the event of overflows.

Planning and Design of Wastewater Facilities

Implementation of the RWSP ensures that adequate wastewater capacity will be available when needed. WTD's forecasting and demand-modeling capabilities, in-field flow monitoring, and ongoing facility inspections provide essential information to identify and address capacity, operational, and maintenance needs. WTD's sections and work units coordinate to assess facility needs and prioritize projects to prevent overflows.

King County designs and constructs its facilities to meet or exceed regulatory and permit requirements. WTD applies good science and engineering to the planning, design, and construction of its facilities and follows industry-recognized standards. As a result, the county's wastewater system exceeds the reliability standards of most major metropolitan areas and has been able to absorb record storm events in recent years with little effect on public health and safety. To ensure the county is keeping up-to-date with regulations and standards information, WTD participates in national organizations and associations that address issues such as pumping standards, treatment and odor control standards and technologies, and predictive modeling tools. In addition, WTD follows the guidelines in the *Criteria for Sewage Works Design* manual. The Washington State Department of Ecology prepares this manual, also known as the "Orange Book". It serves as a guide for the design of wastewater collection, treatment, and reclamation systems and addresses requirements that will lead to approvable plans. State code (WAC 173-240-040) requires that sewer plans and specifications are reasonably consistent with the Orange Book.

Protecting and Managing Capital Assets

A wastewater utility is an extremely capital-asset-intensive industry. King County is currently responsible for over $3.8 billion of replaceable wastewater assets. By 2010, WTD expects to have over $5.3 billion of replaceable assets. Nationwide, the wastewater industry is developing the tools for comprehensive asset management. The objective of an asset management program is to manage infrastructure capital assets to minimize the total costs of owning and operating them while delivering the service level that meets regulatory requirements and customer's expectations.

WTD is developing a formal and detailed asset management plan to optimize the useful life of the county's wastewater facilities. Since the *2004 RWSP Update*, WTD participated in a benchmarking process that compared the agency with 22 Australian and New Zealand utilities that are recognized world leaders in the institution of asset management practices. This process helped to identify what is working well in WTD's asset management program and what areas need improvement. As a result, the asset management program is working in the following areas:

- Implementing a life-cycle cost economic analysis procedure; this procedure will help decide if an asset should continue to be repaired or replaced
- Conducting an extensive asset inventory audit on all treatment process equipment and facilities
- Defining minimum service levels for major processes and critical equipment
- Promoting continuous improvement and world-class best practices in our maintenance work practices, policies, and procedures
- Applying risk management concepts during project identification and prioritization
- Developing forecasted asset replacement plans for WTD's process equipment, facility structures, and conveyance system

WTD reports progress on the asset management program to the Regional Water Quality Committee on an annual basis.

Regularly scheduled condition assessments are performed on the county's conveyance system and facility structures. Findings and rehabilitation recommendations are reported in the facilities inspection annual report. Maintenance performs regularly scheduled condition assessments on critical treatment process equipment. A formal written annual reporting system to include these findings and recommendations is being developed. In addition, policies are being developed for replacing obsolete equipment that may still be useful, but for which manufacturers are no longer providing support.

An Asset Management Pilot Program began in 2005 as part of WTD's Productivity Initiative. The pilot program seeks to evaluate the cost savings from implementing asset management principles with a sample of 153 assets at the South Treatment Plant. The following progress was made through 2006 on this pilot program:

- Identified each asset's condition, age, service level, rebuild/replace intervals and costs
- Completed a financial analysis for pilot assets with rebuild or replacement costs scheduled for 2004–2007
- Deferred $716,800 of capital renewal and replacement work based on detailed condition assessments to ensure system reliability and no reduction in service levels
- Developed guidelines to determine when actions have resulted in costs lower than the target cost

The pilot program is expanding its scope to include all raw sewage pumps. The results of the pilot program will be incorporated into the overall asset management plan.

A comprehensive asset management strategic plan is under way and anticipated to be complete by the end of 2007; this plan will be updated annually. The plan will include information on best management practices for all assets and refine the long-range capital replacement program to best predict which assets will need to be replaced, when they will need to be replaced, and a corresponding budget.

Emergency Response Procedures

King County has established emergency response procedures in the event of sanitary sewage overflows. The 2006 rupture of a force main located in Lincoln Park in West Seattle illustrates how these procedures are implemented. Immediate action was taken to stop the leak by pumping out the force main and using tanker trucks to continue wastewater services while emergency repair and cleanup of the area was completed. The county fenced off the area around the leak and worked with City of Seattle Parks and Recreation staff to close the beach trail north of the Colman Pool. The Washington State Departments of Health and Ecology were promptly notified of the situation. In accordance with WTD's public and media notification procedures, staff posted the area to notify visitors and neighbors of the situation. WTD staff worked closely with nearby neighbors and neighborhood groups to keep them informed and updated during the repairs. Debriefings are conducted after each emergency response event to continually improve performance.

8.1.4 Conducting Research for the Wastewater System

The wastewater services policies direct the county to continue its commitment to funding research and development relating to water quality and technologies for the wastewater system. WTD's technology assessment program continues to investigate new wastewater technologies with the potential to reduce costs, improve water quality, and/or enhance our ability to create resources from wastewater. In 2004–2006, the county conducted pilot-scale studies on the membrane bioreactor (MBR) technology being installed in the new Carnation and Brightwater treatment plants. The studies provided valuable information regarding process control, peaking capabilities, process optimization, and nutrient removal. In addition, the MBR studies provided an opportunity for operations and maintenance staff to become familiar with the technology.

As part of the University of Washington Fellowship Program funded by the county, graduate students are investigating the ability of ammonia oxidizing bacteria to biodegrade estrogen compounds, methods for evaluating digester capacity and stability and co-digestion of a biodiesel byproduct (glycerin) as a means to increase methane production.

A 1-megawatt fuel cell demonstration project was initiated at the South Treatment Plant in 2004 and completed in 2006. The fuel cell converted digester gas into electricity. The results of the demonstration project will be used to determine the use and scope of fuel cells in the future.

The county has also begun assessing the presence and fate of endocrine disrupting compounds (EDCs) in wastewater, surface waters, and soils and the analytical procedures necessary to detect minute quantities of these compounds; this work will continue in 2007.

A greenhouse was installed in 2007 at the South Treatment Plant as part of the county's resource recovery program to showcase the safe use of reclaimed water and biosolids compost in growing ornamental and horticultural plants. Researchers from the University of Washington will be able to use the greenhouse for on-site studies involving reclaimed water and biosolids. Much of their research will focus on answering questions from current and future customers of reclaimed water and will use water from South Plant's sand filters and from membrane bioreactor systems.

Studies currently under way include:

- Effects of reclaimed water on growth of golf course turfgrasses
- Fate and degradation of various organic compounds (pharmaceutical, anti-microbial, and estrogenic compounds) in soil irrigated with reclaimed water and in soil amended with biosolids

The research will also help to fine-tune operational practices.

8.1.5 Fostering Tribal Relations

The wastewater services policies call for the county to continue to foster tribal relations, as appropriate, to structure processes for joint water quality stewardship. WTD regularly works with tribes on its plans and projects. Activities that took place in accordance with this policy guidance in 2004–2006 are as follows:

- Entering into a sewage disposal agreement with the Muckleshoot Indian Tribe; the tribe took ownership over a portion of Auburn's sewer service area
- Working with the Puyallup Tribe to address shellfish contamination of the Quartermaster Harbor area of Vashon-Maury Island
- Working with the Muckleshoot Indian and Suquamish Tribes in the decision process for cleaning up Duwamish River sediments
- Entering into agreements with the Suquamish Tribe and the Muckleshoot Indian Tribe regarding mitigation for the Brightwater project
- Carrying out research studies that are part of the Brightwater mitigation agreement with the Suquamish Tribe regarding marine habitat in Puget Sound; the results of these studies will be also be shared with the Tulalip Tribes
- Working closely with the Snoqualmie Tribe on the Carnation Treatment Plant and entering into an agreement with the tribe to accelerate the wetland discharge option for the Carnation plant
- Reviewing results of Sammamish River monitoring with the Muckleshoot Indian Tribe
- Coordinating with the Muckleshoot Indian Tribe to identify and address concerns regarding the design of the Ballard Siphon Repair project

8.2 Amendments to Wastewater Services Policies

In September 2006, the King County Council approved amendments to RWSP wastewater services policies via adoption of Ordinance 15602 in September 2006. The amendments are as follows:

- Amended Wastewater Services Policy (WWSP)-9 to specify the establishment of an asset management program; prior to being amended, the policy stated that ongoing maintenance and repair of facilities shall be a high priority of King County
- Replaced the words "King County" with "The asset management program" in WWSP-10, so that the policy now reads *"The asset management program shall establish a wastewater facilities assets management plan, updated annually, establishing replacement of worn, inefficient and/or depreciated capital assets to ensure continued reliability of the wastewater infrastructure."*